

**REMARKS:**

Applicant has carefully studied the nonfinal Examiner's Action and all references cited therein. The amendment appearing above and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicant responds to the outstanding Action by centered headings that correspond to the centered headings employed by the Office, to ensure full response on the merits to each finding of the Office.

**Claim Rejections – 35 U.S.C. § 112**

Applicant acknowledges the quotation of 35 U.S.C § 112 first paragraph.

Claims 1-6 stand rejected as being of undue breadth. The Office cites M.P.E.P. 2164.08(a) and in re Hyatt, 708 F. 2d 712, 714-715, 218 USPQ 195, 197 in which is stated that a single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor. The Office states that in this particular case, only "a modulator" is recited in the claim.

Applicant respectfully traverses the finding of the Office.

Applicant contends that, concerning the breadth of a term in a claim, the only relevant concern should be whether the scope of enablement provided to one skilled in the art by the disclosure is commensurate with the scope of protection sought by the claims.

Claims 1-6 have been amended to more clearly define the scope of protection sought by the claims. As described in paragraph [0023] of the disclosure, the present invention discloses a novel quadrature amplitude modulation signal space, identified as a symmetric spherical QAM constellation. The symmetric spherical QAM constellation is a claim element of claim 1 and the structure of the element is described and defined within the details of the specification as in paragraph [0025]. It has been generally held that it is the function of the specification and not

the claims to set forth practical limits of operation and that the specification as a whole must be considered in determining whether the scope of enablement provided by the specification is commensurate with the scope of the claims. In re Johnson, 194 USPQ 197 (CCPA 1977). As such, Applicant believes that claim 1 is not a single means claim that covers every conceivable means for achieving the stated result. Applicant believes that the limitations of claim 1, when read in view of the specification, contain a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented and therefore must be taken as in compliance with the enabling requirement of the first paragraph of U.S.C. 112.

For the reasons cited above, Applicant believes that claims 1-6 are not of undue breadth and request that the claims be allowed.

**Claim Rejections – 35 U.S.C. § 103**

Applicant acknowledges the quotation of 35 U.S.C § 103(a).

Claims 1, 7 and 8 stand rejected under 35 U.S.C § 103(a) as being obvious in view of Laurent (French Patent No. 2,606,233).

Applicant respectfully traverses the finding of the Office.

Citing MPEP 2142, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference or references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

While the Office has stated that it would have been obvious to one of ordinary skill in the art at the time of the invention to implement Laurent's "desire" for the purpose of obtaining a constellation model with a low bit error rate and low power consumption, thereby providing a

minimum amount of motivation, the Office has not presented evidence that without the Applicant's disclosure the Laurent patent suggests all the limitations of claim 1, along with a reasonable expectation of success. As such, applicant believes that the Office has failed to establish a prima facie case of obviousness.

With specific regard to the rejection of claim 1, the limitations of amended claim 1 include a modulator for mapping a binary data stream of bits onto a modulation constellation, including a mapper for mapping data onto a symmetrical spherical quadrature amplitude modulation constellation in a multi-dimensional complex plane, the constellation bounded by a surface comprising all symbol points at a predetermined distance from a center point coincident with an intersection of at least two axes, and corresponding in relative position to the symbol points on opposite sides of the axes.

The Office contends that Laurent discloses a method for multi-dimensional modulation of binary signals and the desire to consider a spherical model representation of signals in which the signals  $M$  are points inside a sphere of radius  $R$  at pg. 4, lines 4-13 and pg. 8, lines 1-5. While Laurent describes a vector space of  $M$  possible signals that is determined so that the set of  $M$  points is represented inside a sphere of the smallest possible radius, placement of symbol points *inside* (emphasis added) a sphere of the smallest possible radius is an objective of all QAM constellations. As described by Laurent at page 4, lines 4-13, the use of a large number of dimensions leads one on the theoretical level to consider a spherical model for representation of signals in which the signals  $M$  are points inside a sphere of radius  $R$ . The minimal distance that separates two distinct points increases with the number of dimensions in question. As one desires to have available  $M$  distant points from at least one minimal distance, in a sphere with  $N$  dimensions, the radius  $R$  of the sphere decreases when the number  $N$  of dimensions increases. As such, on a theoretical level, a spherical model is desired because it provides a low bit error rate and low power consumption. However, the teaching or suggestion to make the symmetric spherical constellation as described and claimed by the present invention, is not found in Laurent. To establish the prima facie case of obviousness, the Office must establish that the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. While the Office has presented motivation to combine or modify the prior art, the Office has not provided evidence that the symmetric

spherical constellation as described by the present invention is obvious in view of Laurent. The Office has not presented any additional evidence that the Laurent reference adequately describes the subject matter of the present invention to place it in the public domain. As such, the Office has not cited a reference that teaches or suggests all the claim limitations presented in claim 1, and therefore a prima facie case of obviousness has not been established.

For the reasons cited above, Applicant believes that amended independent claim 1 is not obvious in view of Laurent and is believed to be in condition for allowance.

Claims 2-8 are dependent upon claim 1, and are therefore allowable as a matter of law.

Claim 9 was previously allowed.

Claims 10-25 are new claims.

If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 507-8558 is requested.

Very respectfully,

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Dated: May 28, 2004

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CERTIFICATE OF FACSIMILE TRANSMISSION  
(37 C.F.R. 1.8(a))

I HEREBY CERTIFY that this Amendment B is being transmitted by facsimile to the United States Patent and Trademark Office, Art Unit 2634, Attn.: Amanda T. Le, (703) 872-9314 on May 28, 2004.

Dated: May 28, 2004

  
Deborah Preza